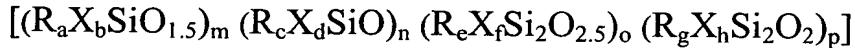


Abstract:

The invention relates to a sub-20 nm nanofiller for use in a matrix material, to the matrix resulting therefrom, to a process for preparing said matrix, and to the use of said nanofiller,

5 the nanofiller comprising functionalized polyhedral oligomeric silicon-oxygen cluster units of the formula



10 with:

a, b, c = 0-1; d = 1-2; e, g, f = 0-3; h = 1-4;

m·b + n·d + o·f + p·h ≤ 4; m+n+o+p ≥ 4; a+b = 1; c+d = 2; e+f = 3 and g+h = 4;

15 **R** = hydrogen atom, alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, cycloalkynyl, aryl, heteroaryl group or polymer unit, which are in each case substituted or unsubstituted, or further functionalized polyhedral oligomeric silicon-oxygen cluster units, which are attached by way of a polymer unit or a bridging unit,

20 **X** = oxy, hydroxyl, alkoxy, carboxyl, silyl, alkylsilyl, alkoxyisilyl, siloxy, alkylsiloxy, alkoxyisiloxy, silylalkyl, alkoxyisilylalkyl, alkylsilylalkyl, halogen, epoxy, ester, fluoroalkyl, isocyanate, blocked isocyanate, acrylate, methacrylate, nitrile, amino, phosphine group or substituents of the type **R** containing at least one such group of the type **X**,

the substituents of the type **R** being identical or different and the substituents of the type **X** being identical or different, with the proviso that there are not more than four substituents of the type **X** per cluster unit.